

R E M A R K S

The office action of November 19, 2004 has been reviewed and its contents carefully noted. Reconsideration of this case, as amended, is requested. Claims 1-13 remain in this case.

Claims 1 through 13 have been amended to fix the continuity errors between the independent claims and the dependant claims. No new matter has been added.

Rejection(s) under 35 U.S.C. §102

Claims 1-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Runnels (USPN 5,882,025). Applicant respectfully disagrees.

Runnels discloses a bicycle with a rhombus with circularly curved apexes drive sprocket and a circular driven sprocket. Due to the shape of the drive sprocket and location of the pedals of the bike, the gear ratio changes so that a low gear ratio is used during the horizontal portion of movement of the cyclist's legs and a high ratio is used during vertical movement.

Applicant's claim 1 states:

"A variable cam timing (VCT) system in an internal combustion engine having a crankshaft coupled to at least one camshaft, the cam timing system comprising:

"a phaser having a housing and a rotor, coupled to the crankshaft and at least one camshaft; and

"at least one timing sprocket associated with the crankshaft or the camshaft, and coupled to the phaser, the timing sprocket comprising at least two groups of toothlike projections including a first group having a first distance to the center of the sprocket, and a second group having a second distance to the center of the sprocket, the first distance being different from the second distance."

Runnels does not teach or disclose "a phaser having a housing and a rotor, coupled to the crankshaft and at least one camshaft." Furthermore, Runnels does not teach or disclose "at least one timing sprocket associated with the crankshaft or the camshaft, and coupled to the phaser."

Therefore, it is respectfully suggested that the rejection of independent claim 1 as being anticipated by Runnels (USPN 5,882,025) is overcome. Dependent claims 2 through 7, being dependent upon and further limiting independent claim 1, should also be allowable for that reason, as well as for the additional recitations they contain. Reconsideration and withdrawal of the rejection are respectfully requested.

Rejection(s) under 35 U.S.C. §103

Claims 8-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tscheplak (EP325724A). Applicant respectfully disagrees.

Tscheplak relates to power transmission pulses being delivered to the flywheel to decrease vibration to the car. The flywheel keeps the engine spinning smoothly between impulses and has sets of springs that absorbs, damps, or decreases vibrations between the engine and the transmission unit. Additional springs also allow the vibration to be raised to a supercritical level above the critical frequency.

Applicant's claim 8 states:

"A variable cam timing (VCT) system in an internal combustion engine having a crankshaft coupled to at least one camshaft, the variable cam timing (VCT) system comprising:

"a phaser having a housing and a rotor, coupled to the crankshaft and at least one camshaft; and

"a resonator positioned upon the at least one camshaft, the resonator including at least one mass and at least one elastic element;

"whereby torsional oscillation of the at least one camshaft at a predetermined engine speed range is increased."

Tscheplak does not disclose "a phaser having a housing and a rotor, coupled to the crankshaft and at least one camshaft." If a phaser was added to Tscheplak, the phaser would not work, since it would have to be placed between the engine and the transmission. An angular phase between the engine and the transmission does not exist and therefore can not be adjusted. Therefore, Examiner's note regarding Tscheplak disclosing a crankshaft and not a camshaft is moot.

Applicant's invention, as stated in claim 8, uses a resonator on the camshaft to **increase** torsional oscillation and torque pulses and thus vibrations in a variable cam timing system. The torsional oscillation is used with the operation of the phaser having a housing and a rotor, coupled to the crankshaft and at least one camshaft.

The purpose, to decreases or damp vibrations between the engine and the transmission, the structure, a two part flywheel coupled together by springs in parallel which absorb torque and vibration, and the overall effect of Tscheplak, to damp or decrease vibrations between the engine and the transmission by use of the springs or to a supercritical level above critical frequency, do not teach or suggest Applicant's invention of a variable cam timing system with a phaser having a housing and a rotor, coupled to the crankshaft and at least one camshaft, a resonator positioned on the camshaft to **increase torsional oscillation** of the camshaft at a predetermined engine speed range. In fact, the overall effect of Tscheplak teaches away from Applicant's invention.

Therefore, it is respectfully suggested that the rejection of independent claim 8 as being anticipated by Tscheplak (USPN 5,882,025) is overcome. Dependent claims 9 through 13, being dependent upon and further limiting independent claim 8, should also be allowable for that reason, as well as for the additional recitations they contain. Reconsideration and withdrawal of the rejection are respectfully requested

Claim 10 was rejected under 35 U.S.C. 103(a) as being unpatentable over Tscheplak (EP325724A) as applied to claim 8 and further in view of Niemic et al. (USPN 5,163,872). Applicant respectfully disagrees.

As stated above, and hereby incorporated by reference, Tscheplak teaches away from Applicant's invention. The purpose, to decreases or damp vibrations between the engine and the

transmission, the structure, a two part flywheel coupled together by springs in parallel which absorb torque and vibration, and the overall effect of Tscheplak, to damp or decrease vibrations between the engine and the transmission by use of the springs or to a supercritical level above critical frequency, do not teach or suggest Applicant's invention of a variable cam timing system with a phaser having a housing and a rotor, coupled to the crankshaft and at least one camshaft, a resonator positioned on the camshaft to **increase torsional oscillation** of the camshaft at a predetermined engine speed range. In fact, the overall effect of Tscheplak teaches away from Applicant's invention.

Niemic et al. does not provide what Tscheplak lacks. Niemic et al. discloses a variable camshaft phaser that has lash take-up drive piston assemblies with inner and outer helical splines for phase changing and return spring mounted in pockets in the pistons to relieve lash take-up friction on the piston return strokes. Furthermore, the elastic element that the Examiner points out as reference number 72, is a seal that engages the flange outer surface to prevent oil leakage into the adjacent camshaft drive housing and is **not an elastic element that is part of a resonator** positioned upon at least one camshaft. Niemic et al. does not show using a resonator on the camshaft to **increase** torsional oscillation and torque pulses and thus vibrations in a variable cam timing system, nor an elastic element that is part of a resonator. Reconsideration and withdrawal of the rejection is respectfully requested.

Claim 11 was rejected under 35 U.S.C. 103(a) as being unpatentable over Tscheplak (EP325724A) as applied to claim 8 and further in view of Venturi et al. (USPN 5,363,819). Applicant respectfully disagrees.

As stated above, and hereby incorporated by reference, Tscheplak teaches away from Applicant's invention. The purpose, to decreases or damp vibrations between the engine and the transmission, the structure, a two part flywheel coupled together by springs in parallel which absorb torque and vibration, and the overall effect of Tscheplak, to damp or decrease vibrations between the engine and the transmission by use of the springs or to a supercritical level above critical frequency, do not teach or suggest Applicant's invention of a variable cam timing system with a phaser having a housing and a rotor, coupled to the crankshaft and at least one camshaft, a resonator positioned on the camshaft to **increase torsional oscillation** of the camshaft at a

predetermined engine speed range. In fact, the overall effect of Tscheplak teaches away from Applicant's invention.

Venturi et al. does not provide what Tscheplak lacks. Venturi et al. discloses a two-stroke engine comprising a crankshaft rotating around a first axis of rotation and having at least one balancing mass, a controller for controlling feeding of at least one combustion chamber, a second shaft rotatable around a second axis of rotation parallel to the first axis of rotation and is rotatably driven by the crankshaft. At least one balancing mass is connected in rotation to the controller so as to achieve a first order balancing of the reciprocating masses of the engine. The masses are counterweights that balance the crankshaft and the camshaft. Venturi et al. teaches away from Applicant's invention. The balancing mass or counterweight connected to the camshaft achieves a first order balancing of forces generated by the vibrating masses of the engine. "Balancing" refers to eliminating the forces of the vibrating masses of the engine. Applicant's invention increases torsional oscillation, it does not eliminate or balance it. Furthermore, the mass in Venturi et al. is not part of a resonator. Reconsideration and withdrawal of the rejection is respectfully requested.

Claims 12-13 were rejected under 35 U.S.C. 103(a) as being unpatentable over Tscheplak (EP325724A) as applied to claim 8 and further in view of Sekiya et al. (USPN 6,332,493). Applicant respectfully disagrees.

As stated above, and hereby incorporated by reference, Tscheplak teaches away from Applicant's invention. The purpose, to decrease or damp vibrations between the engine and the transmission, the structure, a two part flywheel coupled together by springs in parallel which absorb torque and vibration, and the overall effect of Tscheplak, to damp or decrease vibrations between the engine and the transmission by use of the springs or to a supercritical level above critical frequency, do not teach or suggest Applicant's invention of a variable cam timing system with a phaser having a housing and a rotor, coupled to the crankshaft and at least one camshaft, a resonator positioned on the camshaft to **increase torsional oscillation** of the camshaft at a predetermined engine speed range. In fact, the overall effect of Tscheplak teaches away from Applicant's invention.

Sekiya et al. does not provide what Tscheplak lacks. Sekiya et al. discloses a vane type hydraulic actuator with a guide locking mechanism. Sekiya et al. does not disclose a resonator positioned on the camshaft in which an oil pressure actuated phaser is attached, to **increase torsional oscillation** of the camshaft at a predetermined engine speed range. Reconsideration and withdrawal of the rejection is respectfully requested.

Conclusion

Applicant believes the claims, as amended, are patentable over the prior art, and that this case is now in condition for allowance of all claims therein. Such action is thus respectfully requested. If the Examiner disagrees, or believes for any other reason that direct contact with Applicants' attorney would advance the prosecution of the case to finality, he is invited to telephone the undersigned at the number given below.

"Recognizing that Internet communications are not secured, I hereby authorize the PTO to communicate with me concerning any subject matter of this application by electronic mail. I understand that a copy of these communications will be made of record in the application file."

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Dated: January 27, 2005